Modification of equivalent circuit model based on first principle model for robust on-line estimation of state-of-charge (SOC) of lithium-ion battery

최수항, 이재형*
한국과학기술원
(jayhlee@kaist.ac.kr*)

Recently, the hybrid electric vehicle (HEV), or plug-in hybrid electric vehicle (PHEV), is highlighted to contribute to reduce the load of the CO_2 emission from the use of fossil fuel. In this situation, the accurate and robust estimation of state-of-charge (SOC) plays significant role, by allowing user to use one's vehicle efficiently and safely. But the battery model for on-line estimation has disadvantage that the battery SOC is too sensitive to its circumstances so sometimes it can lose its robustness. In this research, the modification of equivalent circuit model for lithium-ion battery will be performed. First, the first principle model will be used to estimate battery SOC in various driving conditions. Second, the equivalent circuit model for the same battery will be used in same conditions. The differences between simulated result and the experimental result will give us the missing information between first principle model and equivalent circuit model. This information will be reflected into equivalent circuit model with additional terms, so we can improve the accuracy and robustness of the model.